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ABSTRACT

A large scale study was undertaken to shed light on the question of school district efficiency, that is, the extent to which school districts are able to increase achievement beyond what would be expected from their families socioeconomic origins. Average scores on state-developed and nationally-standardized tests of third, sixth, and ninth graders in New Jersey districts were regressed on indexes of district socioeconomic status (SES), per-student expenditures, and district enrollment. The numbers of districts entering the analyses, depending on grade level and test, varied from 261 to 507. Average student test scores were significantly associated with the SES of the districts. Higher SES districts, as expected, achieved more than lower SES districts. Per-student expenditures on education were insignificantly associated with achievement test scores, so that low spending districts on average achieved as efficiently as high spending districts. A consistent trend was found for larger districts to achieve less efficiently than smaller districts. In general, the smaller the district, the higher achievement when SES and per-student expenditures were taken into account. These results call into question the practice of school district consolidation and suggest that educational policies and practices, not expenditures, offer the best chance of improving efficiency. (JHZ)

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Expenditure and Size Efficiencies of Public School Districts

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1986

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Abstract

In one of the largest studies yet carried out on the subject, the average scores on state-developed and nationally-standardized tests of third-, sixth-, and ninth-graders in New Jersey districts were regressed on indexes of district socioeconomic status (SES), per-student expenditures on education, and the size of enrollments in the districts. The numbers of districts entering the analyses, depending on grade level and test, varied from 261 to 507. SES accounted for much of the accountable variance; higher SES-districts, of course, achieved more than lower-SES districts. When SES was taken into account, higher expenditures were inconsistently and generally insignificantly (probability less than 0.05) associated with lower test scores; and students in smaller districts generally achieved more than those in larger districts. The inefficiency of expenditures and diseconomies of scale in raising achievement are contrary to popular and considerable professional opinion but corroborate previous research.

Expenditure and Size Efficiencies of Public School Districts

The purpose of this study is to analyze the possible association of achievement test scores in more than 500 districts in New Jersey to their levels of socioeconomic status, expenditures per student, and student enrollments. The study bears upon the efficiency of districts, that is, the extent to which school districts are able to increase learning of their average students beyond what would be expected from their family socioeconomic origins. Efficient districts bring about high levels of learning even though their students may be less socially and economically advantaged than students in other districts.

Socioeconomic status (SES) must be considered in measuring the possible independent effect of per-student educational expenditures and size of enrollments because numerous studies show that children from families of higher SES generally do better on achievement tests than children of lower SES. The association of SES and achievement is pronounced when aggregated units such as schools, districts, and states rather than individual children are analyzed. In educational research, SES most often refers to income, education, and occupational indexes, although home, neighborhood, and census tract data are sometimes used (White, 1982).

The largest compilation of correlations of SES and academic achievement contains 620 correlation coefficients from almost 200 sociological and psychological studies (White, 1982). Nearly all 620 correlations were positive; in nearly all instances, children from higher SES

families, neighborhoods, and districts scored higher on achievement tests than did lower SES units. Aggregate data for schools, neighborhood, and districts yielded a median correlation of 0.73 which suggests that 53 percent of the variance in achievement at the aggregate level is associated with SES by itself disregarding financial and educational factors.

Research on the possible dependence of aggregate achievement on SES and expenditures nearly always shows SES to be powerfully and positively predictive of achievement, and expenditures to be weakly, inconsistently, and often negatively related to achievement (Hanushek, 1981). Walberg (1977), for example, found that state scores on the Selective Service draft tests given in 1970 to eighteen-year olds were strongly related to median years of education completed by adults in the state but statistically unrelated to cost-adjusted per-student expenditures, and expenditure effort, that is, the fraction of personal income per capita spent on public schools in the state. Among the states, South Carolina's failure rate of 24.6 percent was 35 times higher than Minnesota's 0.7 percent. Despite this vast range, SES but not expenditure was related to failure rates.

Expenditure and Achievement

A substantial literature shows no consistent association between spending on education--including both total per-student expenditures as well as specific spending on such things as class-size reductions, physical facilities, teacher salaries and the like--to how much students learn. This irony led the eminent economist and former president of the American Association for the Advancement of Science, Kenneth E. Boulding (1972), to present to

the American Educational Research Association a paper titled "The Schooling Industry as a Possibly Pathological Section of the American Economy." He noted that schooling doubled its share of the American economy from about 3 to 6 percent in real prices from 1930 to 1970 and was "unprogressive when it comes to productivity" (p. 135).

Boulding called for improvements in the educational productivity or "knowledge and skill per real dollar expenditure" (p. 137). He saw the major obstacle to progress as the lack of incentives for educators to improve their effectiveness: "Educators receive their incomes mainly, let us be frank about it, from the by-products of custodial care and certification, and if an educator develops an exceptionally productive method of increasing knowledge and skill he is not likely to be particularly well rewarded for it" except for "the satisfying feeling that his work has been done" (p. 138).

Current compensation policies illustrate the lack of incentives. School boards pay teachers not according to the quality or quantity of their performance, but their degrees and years of experience, neither of which consistently significantly correlates with student learning gains (see summary of evidence below). School boards, moreover, most often pay superintendents and other central-office administrators according to the number and salaries of other administrative staff that report to them. Principals are often paid according to the numbers of educational staff or students in their school.

Rather than increasing learning, these policies give incentives to: multiply the numbers of administrative staff; hire and retain teachers

irrespective of merit, thereby lowering class sizes; and retain students, however little they learn. These policies may consume scarce funds while contributing little to learning.

Research Review

About the time Boulding gave his address, economists at the Rand Corporation (Averch, Carroll, Donaldson, Kiesling, and Pincus, 1972) provided the first synthesis of research on costly administrative, economic, and sociological "inputs" to schools such as expenditures per student; administrative and special-staff costs; teacher degrees and experience; and district, school, and class sizes. Their conclusions and those of others that followed them supported Boulding's contention: "Research has found nothing that consistently and unambiguously makes a difference in student outcomes" (Averch and others, p. 154). (These authors were discussing costed inputs, not instructional factors such as instructional quality and time that make for large differences in learning, Walberg, 1984.)

Bridge, Judd, and Moock's (1979) more recent synthesis also supports Boulding's contentions. They compiled 28 studies of the dependence of learning on administrative, financial, and sociological "inputs" to schooling including expenditures per student, and came to no conclusive findings. Indeed, statistical analysis of the results show that only one input--socioeconomic status--among the 35 surveyed had statistically significant association with learning across the studies.

Pupil-teacher ratios or class sizes are among the weakest effects on learning, except at class sizes below about five to ten which amount to

tutoring groups. One of the largest syntheses of learning effects ever conducted showed smaller classes benefited learning more than did larger classes in only 60 percent of 691 comparisons of small and large classes (Glass, Cahen, Smith, and Filby, 1982). Close to a 50-50 split, this percentage comes close to what would be expected by chance alone (as in coin flipping) and is far less consistent than the effects of such things as amount of time allocated for learning, superior teaching techniques, and graded homework that produce large and highly consistent effects on learning.

The results summarized by Bridge, Judd, and Moock (1979) for other inputs also showed insignificant associations with student learning. These include teacher salaries and the costs of non-teaching staff such as administrators and auxiliary personnel. They also include physical plant characteristics such as the age of the school building and dollar value per pupil; and expenditures on libraries, books, and supplies.

In his book on the influence of school resources on the learning of inner-city children, Murnane (1975) also reviewed the literature on costed inputs and concluded: "The role of school resources in affecting the achievement of children is an unsettled question. The research that has been done has not had conclusive results" (p. 28). About teacher experience--a major determinant of expenditures--he wrote: "Most educators believe that teachers improve with experience, at least in the first few years of teaching. Research, however, has not been able to find a strong, consistent relationship between experience and (student) performance" (p. 29).

Levin (1970) compared the effects of selecting brighter rather than more experienced teachers. According to his results, hiring teachers of high verbal ability would be five to ten times more effective per dollar of expenditure in increasing students' achievement than hiring more experienced teachers. Yet teachers continue to be paid according to years of experience rather than ability and performance.

In reviewing studies of school-district expenditure equalization, Carroll (1982) and Geske (1983) both concluded that increased expenditures go mainly into administrative and auxiliary activities. As Carroll explains: "School districts broadly agree on what constitutes an acceptable instructional program and they exert every effort to provide one. In doing so, low-revenue districts concentrate on necessities and make do with disproportionately few non-instructional resources. Districts with higher revenue per pupil provide a somewhat costlier instructional program, but they devote much larger shares of their budget to non-instructional purposes" (p. 242).

Recent Reviews

The more recent and comprehensive quantitative syntheses of research continue to show little or no association of financial inputs and learning. Mullin and Summers (1983), for example, found more than 5,000 reports and articles on Title I and other compensatory extra-expenditure programs for poor children; but only 28 were valid evaluations with program costs and achievement test results on representative samples of students. This dearth of scientific research is surprising in itself since the federal government

spent $50 million in evaluating the program in its first decade alone.

With respect to expenditures on Chapter 1 programs, Mullin and Summers found "no significant association between dollars spent and achievement gains" (p. 339). Furthermore: "The burden of evidence does not support sustained positive effects of Chapter 1. Instead, the evidence suggests that statistical procedures have exaggerated estimates of gains, that no particular grade level can be identified as particularly advantageous for intervention, that no particular program characteristic is consistently beneficial, and no clearly established evidence exists that shows positive effects have been sustained" (p. 341).

The most comprehensive synthesis on the possible effects of total expenditures and specific costed inputs on achievement also shows no consistent association between expenditures and learning. From a quantitative synthesis of 130 econometric studies, Hanushek (1981) concluded: "The available evidence suggests that there is no relationship between expenditures and achievement of students, and that such traditional remedies as reducing class sizes or hiring better trained teachers are unlikely to improve matters" (p. 19).

The basis of Hanushek's conclusion is a tabulation of the number of positive and negative, significant and non-significant regression coefficients of expenditures per student and other costly inputs in predicting (with socioeconomic status, prior achievement, or IQ adjustments) student test scores and other educational outcomes. The inputs included: expenditures per student; teacher-student ratios; teacher salaries, education, and

experience; and quality indices of facilities and administrators.

Of the 554 significance tests of the coefficients for the seven indicators (which are, of course, the main determinants of educational costs), an average of 82.4 percent were insignificant. Ignoring significance and examining the sign of the coefficients alone reveals that several costly factors are more often negatively than positively associated with test scores; larger staff-to-student ratios, for example, were more often associated with lower scores--contrary to common opinion and the claims of teacher unions. (Hanushek found, however, a slight tendency for the students of more experienced teachers to achieve somewhat more than those of less experienced teachers. Because this result was inconsistent, and because more experienced teachers may be employed in schools with brighter students, Hanushek attached no policy significance to this finding.)

Hanushek categorized his sample of 130 studies by types of educational outcomes, categories of students and schools, equation specifications, and ratings of the methodological validity of the studies. But this more intensive search for systematic benefits of costly inputs left his conclusions unaltered (p. 25).

Glasman and Biniaminov's (1981) recent but less extensive compilation of results of 33 school input-output studies also makes possible tabulations and tests of financial inputs. The results on expenditures, class size, library books per student, school facilities, and teacher salaries are insufficiently consistent to produce statistical significance (in binomial sign tests) across studies.

Thus, it appears that neither general spending nor spending on specific components of educational budgets has much to do with learning. Additional spending increments within the normal range of spending have little effect on learning insofar as empirical research is concerned. The absence of effect contrast starkly with consistently positive and, in some cases, quite large effects of systematic teaching and other programs discussed elsewhere (Walberg, 1984)

District Size

Hoping for production economies of scale and greater staff specialization, many small school districts have consolidated into larger units. The mean number of students enrolled in U.S. districts rose from about 200 in 1930 to almost 3,000 in 1972. The average number of constituent citizens represented by each school board member rose from about 250 to more than 2,000. Many states, such as Illinois, have encouraged districts to consolidate to ever larger units (Guthrie, 1979).

Research on the district size, however, is at best equivocal; and much of it suggests that bigger districts yield low achievement, and poor student, parent, and staff morale (Guthrie, 1979; Fox, 1981; Butler and Monk, 1985). The educational blight of Chicago, Los Angeles, New York, and other large cities is well known, even though their per student expenditure levels are often considerably higher than surrounding many higher achieving but smaller suburban districts.

Butler and Monk's recent study of schools districts in New York State exemplifies recent findings: "The analysis of scale economies enjoyed by

larger districts can come at the expense of the efficient production of educational outcomes. . . . Empirical evidence from New York State is presented which shows that lower levels of efficiency exist in large as compared to small districts" (p. 3). Bidwell and Kasarda (1975), and Turner, Camilli, Kroc, and Hoover (1986) also found larger districts to achieve less efficiently.

It is important to distinguish between spending efficiency and production efficiency, or between how much is spent and how well it is spent. It appears that very small districts, say, those less than 300 students and especially those less than 200, spend more per student than larger districts because a school board, superintendent, principal, and some minimum staff, activities, and equipment are needed no matter how small the district, and because low-enrollment districts are likely to be in sparsely settled areas which require more transportation. Per-student costs of districts from 500 to 5,000 and over, however, differ very little (see, for example, Figure 2 of Turner, Camilli, Kroc, and Hoover, 1986, p. 8); and previous research suggests that smaller districts obtain more achievement value per dollar.

Method of Research

The New Jersey Department of Education collects district-level data on achievement test scores and per student expenditures, as well as on the size of student enrollments, and socioeconomic status characteristics of the public school districts of the State. These variables were analyzed to estimate the relation of achievement to the district characteristics, in particular, to the

provision of efficient education.

"Efficiency," as defined earlier, refers to the common dictionary meaning of the term which denotes effectiveness without waste or in consideration of given scarce resources. In the present case, the scarce resources are per-student educational expenditures; and the question raised concerns the existence of the effect of these expenditures on achievement beyond what would be expected from the socioeconomic status of the districts. A second question concerns the possibilities of economies (or diseconomies) of scale, that is, the tendency for larger districts to perform more (or less) efficiently than smaller districts.

Achievement Tests

In response to 1976 State legislation, the New Jersey Department of Education developed the Minimum Basic Skills (MBS) test to measure proficiencies necessary to function politically, economically, and socially in a democratic society. Starting in 1981-82, the MBS test was used to satisfy the State graduation law. The purpose of the subsequently-developed High School Proficiency Test (HSPT) was to replace the MBS test and to measure a set of higher skills than measured by the MBS and to satisfy the State graduation law.

The Department engaged in an elaborate procedure with expert assistance from Educational Testing Service (1978-79), National Evaluation Systems (1980-84) and the National Computer Systems (1984 to present) to produce valid tests that reflect the consensus of educators and other groups in the state about what is important for students to learn. The tests have

internal-consistency reliabilities in the range beyond 0.90, which is more than adequate for group, that is, district comparisons.

In addition to developing these tests, the Department also derives passing scores for the commercial tests used in grades other than those in which State-developed tests are employed. These tests are commonly recognized by educators throughout the U.S. as tapping academic skills and content necessary for students to master in school to prepare themselves to compete with their peers in society at large. For these reasons, most school districts throughout the country use these or similar tests to assess student progress as well as the general effectiveness of their districts and specific programs.

The 1983-84 achievement tests available for analysis are shown in Table 1. The first four are the High School Proficiency Tests which consist of a multiple-choice writing examination, a written and graded essay, and multiple-choice tests of reading and mathematics. The scores are expressed as means for each school district. The next two tests are the Minimum Basic Skills in reading and mathematics; scores for districts are expressed as the percentages of students attaining State-acceptable passing scores. The first six tests in Table 1 are given to ninth graders throughout the State.

The remaining four measures in Table 1 are several State-equated commercial tests of reading and mathematics which are administered to third and sixth graders. District performance is taken as the percentage of students that attain acceptable passing levels equated by the Department to the passing scores on the Minimum Basic Skills (MBS) tests.

Table 1 shows that achievement scores were available for 261 districts with ninth grades, 507 districts with sixth grades, and 496 districts with third grades. The average test scores for districts, as shown in the table, vary considerably from lowest to highest districts. The percentages of children passing the third-grade mathematics test, for example, ranged by a factor of 2.6 from 39 percent to as high as 100 percent.

Socioeconomic Status

To compare the achievement of districts of similar SES, the New Jersey Department of Education originally developed the District Factor Group (DFG) index from 1970 U.S. Census data on the State. In 1984, the Department improved the index on the basis of 1980 census data. The SES index consists of a factor-weighted composite of the educational level of adults in the district, their occupational status, number of persons per household, percent of the district considered urban, median family income, percent of the workforce receiving unemployment compensation, and the percent of the residents below the poverty line.

The State employed principal components analysis to assign weights to each variable in the composite that maximize what they have in common; and the districts are divided into ten near equal-sized groups named from "A" (lowest) to "J" (highest). The Department of Education, in research on the validity of the SES index, reported that it correlated 0.54 with mathematics achievement and 0.60 with reading achievement. Table 1 shows that the uncategorized SES index varies from -6.53 to 5.71 and is available on 557 districts.

Expenditure Indexes

Table 1 shows statistics on the three district expenditure indexes available for analysis, which are here referred to as Day School, Total, and Current Budget expenditures. Although all three measures are highly correlated, audited expenditures, that is, Day School and Total, are preferable to Current Budget figures since they are indications of actual rather than merely planned expenditures. In addition, the Current Budget is less preferable because it omits planned expenditures for current operating programs such as State bilingual programs and compensatory State and federal programs for poor children.

Of the two audited expenditures, Day School expense is preferable to Total Expense because it reflects the costs of current programs rather than including long-term debt. Division of current expense by average daily enrollment to calculate Day School expense is also preferable because it reflects the number of students benefiting from current program expenditures rather than the number of students residing in the districts, some of which may attend special schools or transfer to schools in other districts. Even though Day School expense seems the best indication of expenditures, the analyses in this report were carried out on all three indexes; and they yielded nearly identical conclusions.

Table 1 shows that the districts varied considerably in per-student spending as revealed by all three indexes. Day School expense, for example, averaged $3,718 and ranged by a factor of 3.5 from $2,358 to $8,274. The other two indexes of expenditures, as also shown in the table, also range

considerably.

Size of District Enrollment

In addition to the variables described, district enrollment or size was available for analysis. Size offers one possible explanation of why districts do well or poorly relative to expenditures and socioeconomic status. In the case of New Jersey, district enrollments indexed by average daily enrollment vary dramatically. Table 1 shows that the average daily enrollment varies from 36 to 56,293 students. The average of all districts is 2,004.

Results and Discussion

Table 2 shows the correlation of socioeconomic status, expenditures, and district enrollments with one another and the test scores in the districts. It can be seen that socioeconomic status (SES) correlates moderately with the three expenditure indexes. This means that higher SES districts tended to spend more on their students than lower SES districts. In addition, as many aggregate studies have shown, SES is a strong predictor of achievement especially at grade nine in which the correlations range up to .84 and account for as much as 71 percent of the variance in achievement.

Table 2 also shows that the three expenditure indexes are closely correlated; the correlations range from 0.81 to 0.94. This means that districts that spent the most as indicated by one index were also likely to spend the most by one of the other two indexes. A high ranking on one index, in other words, predicts a high ranking on another.

The expenditure indexes correlated weakly to moderately with achievement. In contrast to the SES-achievement correlations, which ranged

from 0.34 to 0.84, the SES-achievement correlations were generally smaller and ranged from 0.11 to 0.52.

The associations of SES with expenditures and achievement are illustrated in Figure 1. The higher the SES of the districts, the more spent on education on average, and the higher the achievement. The critical question for the analyses below is whether expenditures make a contribution to achievement when SES is taken into account.

Table 2 shows that the achievement test scores correlated negatively with enrollment to a moderate degree. This means that the larger the number of students in a district, the lower the students scored on the State and national tests.

Socioeconomic Status

Table 3 shows the regression of achievement test scores on the (uncategorized or continuous) SES factor index, district size, and the three expenditure indexes. With respect to SES and with the other variables, expenditures and district size, controlled in the regression, all coefficients are statistically significant at the 0.05 level; SES is consistently linked to achievement.

To take the example of ninth-grade writing in the equations for Day School expense, the coefficient for SES in Table 3 shows that each one-point increase in SES (which ranges from -6.53 to 5.71) is associated with a rise of 2.21 points in the test score. The approximate 12-point spread of SES from lowest to highest district is associated with an estimated 27-point achievement range of a total range of 29 points (see Table 1). These results

are hardly new; as White's (1982) compilation of nearly 200 studies shows, almost all studies have shown strong links between parental SES and achievement, particularly with aggregate data on schools, districts, and states.

Financial Expenditures

Table 2 shows that the correlation of SES and the ninth-grade writing scores is 0.84; its square or accountable variance is 0.71. As shown in Table 3, adding expenditures and district size to the SES only raises the accountable variance to 0.75.

Table 3 shows that the coefficients for the three expenditure indexes are nearly all negative and insignificant. The few significant coefficients are negative. Thus, if anything, higher expenditures are associated with lower achievement once district SES and size are taken into account. This generally insignificant, inconsistent, or even negative association of expenditures and test scores confirms previous research discussed in a previous section.

Little additional variance in achievement is accounted for by adding expenditures to the equations. The results contradict the hypothesis that higher expenditures are associated with higher achievement when the effects of socioeconomic status are controlled, that is, that expenditures make an independent contribution to achievement beyond that predictable from SES.

This general absence of significant relation or generally negative relation

can be seen in example of ninth-grade reading achievement in Figure 2. The set of districts with the highest average achievement beyond what would be expected from their SES (SES-regression-adjusted residual) expended the least amount of money for education, below $2,401 (in Day School Expenditures). The set of districts with the lowest achievement adjusted for SES spent between $2,400 and $2,701.

Districts that expended more than $2,700 achieved roughly about what might be expected from the SES categories. There is no steady or significant tendency for high spending districts, including the category above $5,400, to score much higher than would be expected from their SES category. In addition, when quadradic expenditure terms where entered into the regression equations (not shown in the tables) to test for diminishing returns or other non-linearity, none of the coefficients were significant.

District Enrollment or Size

Table 3 shows that adding district enrollment or size to the equation significantly increases the variance in achievement accounted for; and, in all cases, larger district enrollments are associated with lower test scores. The results contradict the hypothesis sometimes put forward that large districts are more efficient. When SES and expenditures are taken into consideration, large districts in New Jersey were generally less efficient in enhancing achievement. Quadratic terms entered into the regressions (not shown in the tables) revealed no tendency for middle-sized districts to do generally better than smaller districts.

This negative association of size and achievement is illustrated in Figure

3. On average, all districts below 2,601 in student enrollment scored higher than predicted from their SES levels. On average, all districts above 3,900 in enrollment scored below prediction. The highest category, school districts with enrollments above 7,150 scored on average the worst of all--3 points below what is predicted from their levels of SES. The results in Figure 3 are merely illustrative. Similar inverse relations of size and achievement were found with respect to all tests, that is the High School Proficiency Test, the Minimum Basic Skills test, and the commercial tests at all grade levels (see Table 3).

Conclusions

The results of the study corroborate a large amount of past research. The chief conclusions are as follows:

1) Average student test scores on State-developed and national achievement tests in New Jersey school districts are closely and significantly associated with the socioeconomic status (SES) of the districts. Higher SES districts have generally (or on average) higher scores; lower SES districts have generally lower scores.

2) Per-student financial expenditures on education are insignificantly or inconsistently associated with achievement test scores. Low spending districts on average achieve as efficiently as high spending districts.

3) Although the first two conclusions points confirm much previous research, evidence for the third conclusion is less voluminous: A consistent trend, nonetheless, was found for larger New Jersey districts to achieve on average less efficiently than smaller districts in the State.

In the light of previous research on educational productivity (Walberg, 1984), it appears that it is the educational policies of districts and the instructional practices of schools rather than expenditures that consistently determine achievement and efficiency. Thus, changes in educational policies and practices rather than expenditures offer the best chance of improving efficiency.

In view of Guthrie's (1979) review, moreover, as well as recent major studies of districts in Colorado (Bidwell and Kasarda, 1975; Turner, Camilli, Kroc, and Hoover, 1986), and the present study of New Jersey, consolidation of districts into larger units that has been taking place for the past half century may have been a move in the wrong direction. Generally, it appears that the smaller the district, the higher the achievement when the socioeconomic status and per-student expenditures are taken into account. Why? Superintendent and central staff awareness of citizen and parent preferences, the absence of bureaucratic layers and administrative complexity, teacher involvement in decision making, and close home-school relations--these may account for the efficiency of small districts.

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Table 1

Univariate Statistics

Variable	Number of Districts	Mean	Standard Deviation	Minimum	Maximum
Socio. Status	557	.00	1.96	-6.53	5.71
Day School Exp.	557	3718.13	734.05	2358.24	8273.69
Total Expense	557	3979.52	830.56	2416.98	9798.60
Current Budget	557	2883.17	579.18	803.00	5485.00
Enrollment	557	2004.53	3615.00	35.90	56293.70
Writing-9	261	79.61	5.48	60.27	89.56
Essay-9	261	7.94	.85	5.08	10.41
Math-9	261	64.80	8.19	40.53	81.98
Reading-9	261	79.56	6.33	55.60	90.77
Reading%-9	261	94.02	6.61	58.90	100.00
Math%-9	261	95.20	5.23	66.50	100.00
Reading%-6	507	95.71	6.73	50.00	100.00
Math%-6	507	92.06	8.14	54.80	100.00
Reading%-3	496	91.93	8.91	51.70	100.00
Math%-3	496	90.69	9.09	39.10	100.00

Table 2

Correlations of Variables

Variable	Socio. Status	Day School Expense	Total Expense	Current Budget	District Enrollment
Socio. Status	1.00*	.41*	.38*	.55*	-.16*
Day School Exp.	.41*	1.00*	.94*	.86*	-.04
Total Expense	.38*	.94*	1.00*	.81*	-.02
Current Budget	.55*	.86*	.81*	1.00*	-.08
Enrollment	-.16*	-.04	-.02	-.08	1.00*
Writing-9	.84*	.36*	.32*	.52*	-.45*
Essay-9	.83*	.35*	.30*	.50*	-.44*
Math-9	.83*	.36*	.32*	.51*	-.37*
Reading-9	.82*	.34*	.31*	.50*	-.47*
Reading%-9	.69*	.27*	.24*	.43*	-.56*
Math%-9	.61*	.20*	.18*	.36*	-.49*
Reading%-6	.34*	.10*	.10*	.17*	-.27*
Math%-6	.47*	.17*	.16*	.27*	-.22*
Reading%-3	.54*	.12*	.11*	.22*	-.30*
Math%-3	.46*	.16*	.15*	.21*	-.24*

Note: Correlations significant at the .05 level are marked with an asterisk.

Table # 3

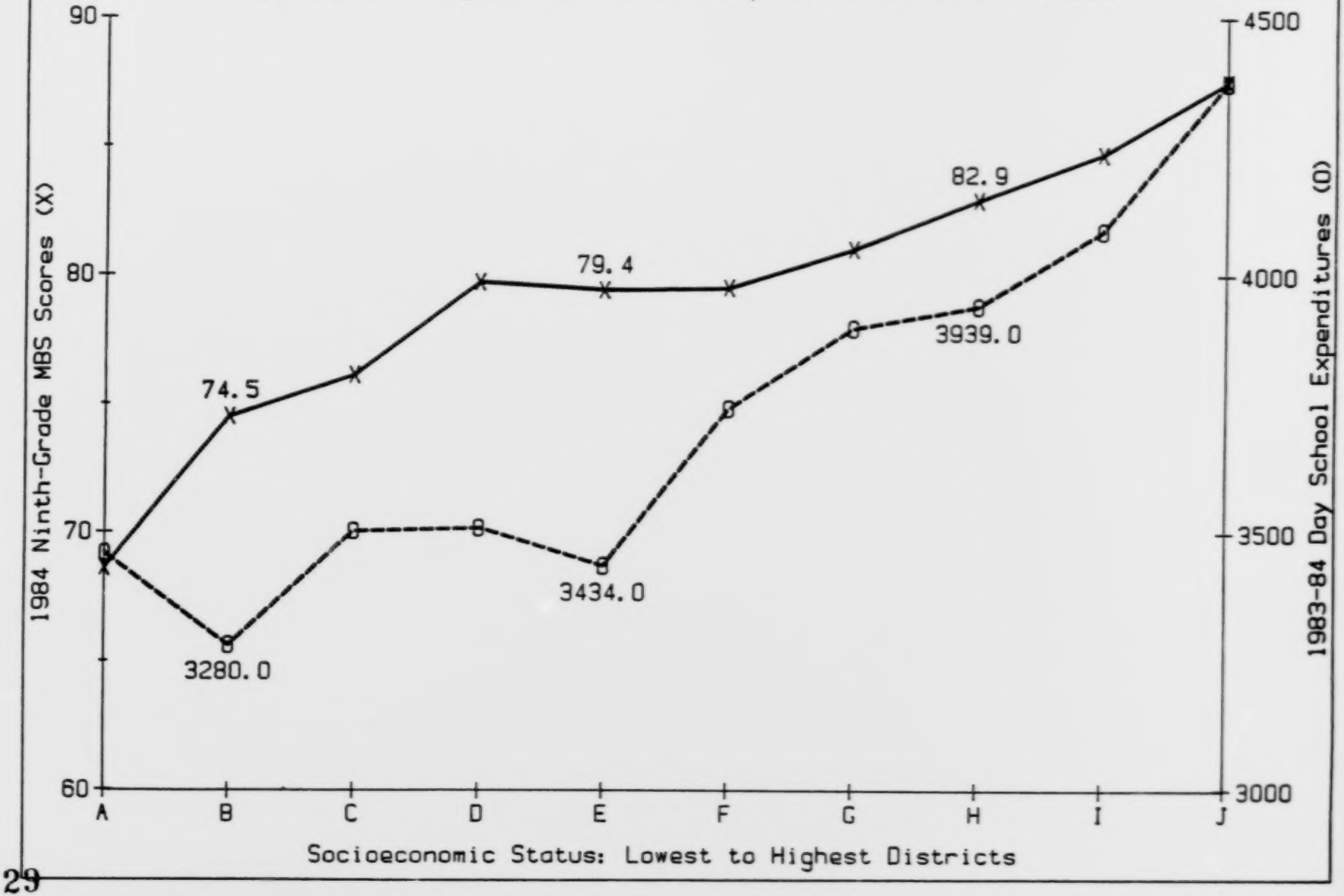
Association of Achievement with Socioeconomic Status, Expenditures, and District Size

Subject-Grade	Constant	Socio. Status	Expend. Type	Size	Explained Variance
			Day School Expense		
Writing-9	82.05*	2.21*	-.00047	-.00023*	.75*
Essay-9	8.38*	.34*	-.00009	-.00003*	.73*
Math-9	67.66*	3.36*	-.00063	-.00020*	.70*
Reading-9	82.90*	2.47*	-.00064	-.00031*	.73*
Reading%-9	98.53*	1.98*	-.00073	-.00053*	.60*
Math%-9	99.88*	1.44*	-.00091*	-.00037*	.47*
Reading%-6	98.23*	2.49*	-.00140*	-.00048*	.34*
Math%-6	92.90*	2.04*	-.00035	-.00039*	.24*
Read%-3	97.90*	1.09*	-.00037	-.00039*	.16*
Math%-3	94.03*	1.87*	-.00035	-.00031*	.24*
			Total Expense		
Writing-9	80.63*	2.16*	-.00009	-.00023*	.75*
Essay-9	8.14*	.33*	-.00002	-.00003*	.72*
Math-9	65.44*	3.28*	-.00005	-.00020*	.70*
Reading-9	80.79*	2.39*	-.00008	-.00031*	.72*
Reading%-9	97.10*	1.92*	-.00033	-.00053*	.60*
Math%-9	98.32*	1.38*	-.00046	-.00037*	.47*
Reading%-6	98.10*	2.49*	-.00129*	-.00048*	.34*
Math%-6	93.32*	2.06*	-.00044	-.00039*	.24*
Read%-3	97.65*	1.08*	-.00029	-.00039*	.16*
Math%-3	93.78*	1.86*	-.00027	-.00031*	.24*
			Current Budget		
Writing-9	81.10*	2.19*	-.00028	-.00024*	.75*
Essay-9	8.28*	.34*	-.00008	-.00003*	.72*
Math-9	66.36*	3.33*	-.00037	-.00020*	.70*
Reading-9	81.86*	2.45*	-.00046	-.00031*	.72*
Reading%-9	96.87*	1.94*	-.00037	-.00053*	.60*
Math%-9	98.05*	1.40*	-.00055	-.00037*	.46*
Reading%-6	98.30*	2.57*	-.00183*	-.00049*	.34*
Math%-6	94.26*	2.14*	-.00093	-.00039*	.24*
Read%-3	97.60*	1.09*	-.00037	-.00039*	.16*
Math%-3	92.34*	1.80*	+.00014	-.00031*	.24*

Note: Correlations significant at the .05 level are marked with an asterisk.

Figure 1

Average Reading Achievement and Expenditures Related to SES



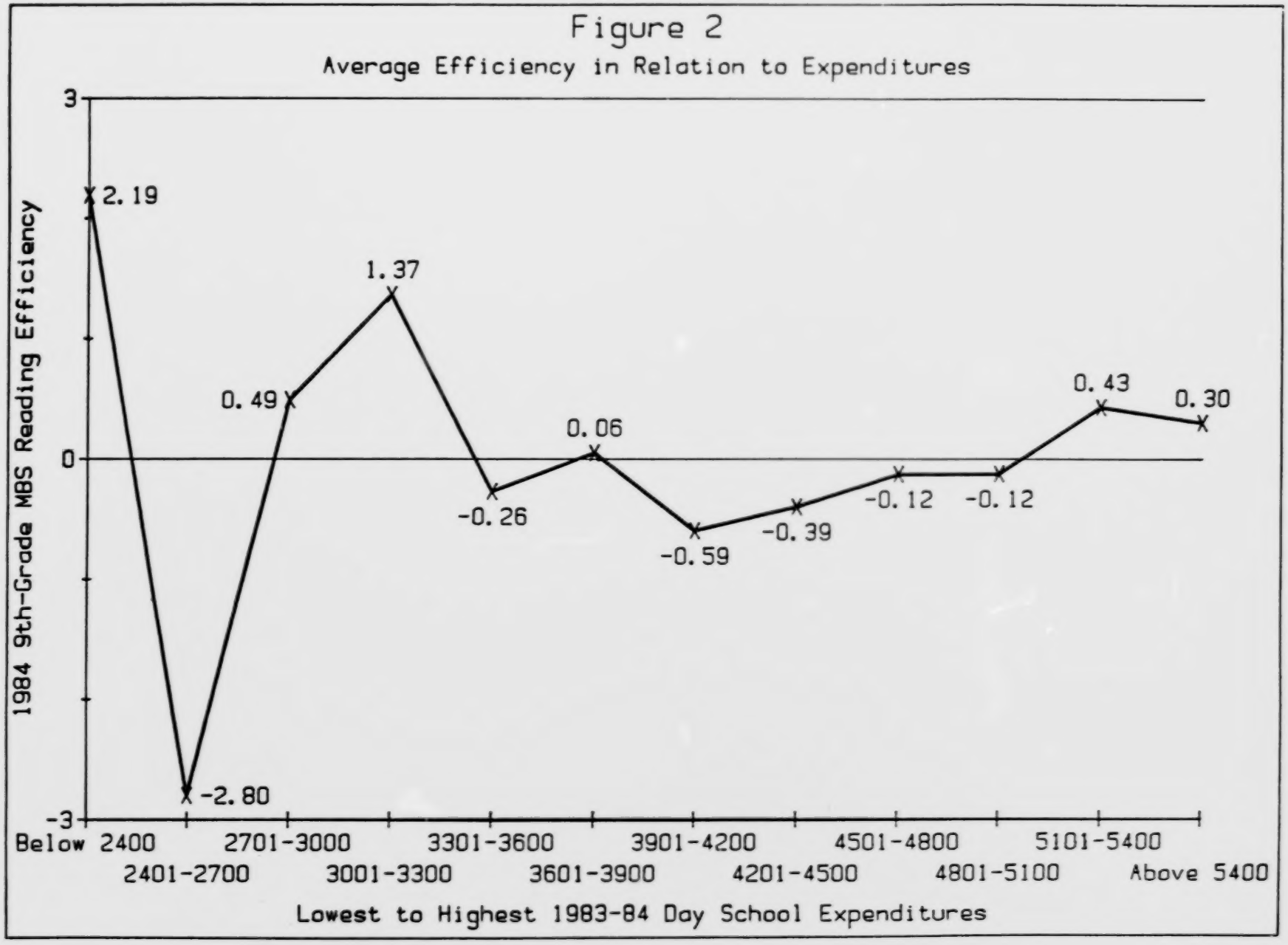


Figure 2
Average Efficiency in Relation to Expenditures
3
0
-3
1984 9th-Grade MBS Reading Efficiency
2.19
-2.80
0.49
1.37
-0.26
0.06
-0.59
-0.39
-0.12
-0.12
0.43
0.30
Below 2400
2401-2700
2701-3000
3001-3300
3301-3600
3601-3900
3901-4200
4201-4500
4501-4800
4801-5100
5101-5400
Above 5400
Lowest to Highest 1983-84 Day School Expenditures

Figure 3

Average Efficiency in Relation to Size of District Enrollment